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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/552,119

10/27/2006

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EXAMINER

MASHRUWALA, NIKHIL P

ART UNIT

PAPER NUMBER

3749

MAIL DATE

DELIVERY MODE

03/17/2009

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/552,119	Applicant(s) CARABIN ET AL.	
	Examiner NIKHIL MASHRUWALA	Art Unit 3749	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-25 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-25 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 04 October 2005 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☒ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. ____. |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>12/28/2006</u> . | 6) <input type="checkbox"/> Other: ____. |

DETAILED ACTION

Response to Amendment

1. Applicant's request on 01/05/2009 for reconsideration of the finality of the election/restriction of the Office action of 09/05/2008 is persuasive and, therefore, the finality of that action is withdrawn.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

3. Claims 1, 3-9 and 18-19 are rejected under 35 U.S.C. 102(e) as being anticipated by US Pub 2003/0209174 of Chan.

For claim 1 Chan shows a two-stage plasma process 100 per figs 1-3 for converting waste having organic and inorganic components into fuel gas, which comprises: (a) in the first stage, vitrifying or melting the inorganic components (scrap steel) of the waste and partially gasifying the organic components (other waste) in a gasifier/melter 4 per figs 1-2; and (b) in the second stage, completing the gasification of the organic components so that gas from the first stage of the process entering the secondary gasifier 3 per fig 3 (cyclone oxidizer) is exposed to a high temperature such as to transform essentially all soot present in the gas to CO and to convert essentially

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all complex organic molecules to simpler molecules CO, CO₂ and H₂ (see col 3, lines 45-57 and summary col 3, lines 10-23 for two stage gasification of the waste).

For claim 3, the fuel gas produced in the second stage gasifier 3 is cooled in a heat exchanger 7 & the cooled gas is treated by air pollution control system 8 (see col 7, lines 3-5) and the final by-product gas having high quality combustible synthetic gas can be used for electricity generation (see col 6, lines 59-62).

For claims 4 and 6-8, first gasification of the waste is carried out in a plasma arc furnace 4 (col 3 line 50) having refractory linings (col 3, line 63) furnace per fig 2 provided with two DC graphite electrodes 15 (col 3, line 51) so as to generate a plasma arc between cathode electrode and scrap steel metal (col 4, lines 25-28). The plasma arc furnace 4 is being preheated to temp above 1500 deg C (col 3, line 62) having a slag layer of such molten inorganic metal at the bottom so as to take it out from spout 33.

For claim 5, second gasifier/cyclonic oxidizer 3 is using a plasma torch 18 (col 3 line 51) with addition of metered amounts of Oxygen, air and/or steam (col 6, line 44-46).

For claim 9, the two-stage plasma system 100 of Chan shows a process controller 6 to inject metered liquid and gaseous hazardous waste using sensors through atomizing nozzles 30 and 31 and control valves 10 & 11 so as to get achieve gasification of organic material in the waste.

For claim 18, the gasifier 4 shows to maintain a negative pressure using an exhaust fan (col 5, lines 22-26).

For claim 19, the process 100 has a very high temperature so as to prevent formation of dioxin (col 5, line 12-13).

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

6. Claim 10 is rejected under 35 U.S.C. 103(a) as being unpatentable over Chang due to obviousness. The primary gasifier 4 of Chan discloses a preheated temperature of the furnace above 500 deg C to get the molten scrap metal bath and it obvious to consider much lower temperature for waste gas around 700 to 800 deg C to constitute a cold top for the fresh waste added to the furnace 4.

7. Claims 13-17 and 20-25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chan in view of US patent 5,960,026 of Nolting et al.

For claims 13 and 15 , even though the secondary gasifier 3 of Chan is a cyclonic plasma torch oxidizer having a oxidization reaction efficiency to be increased

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by intense internal mixing between by-product gas and injected atomized oxygen and steam caused by vigor of cyclonic action with the gasifier 3 (col 5, lines 54-58) and plasma temperature up to 5000 deg C (col 6, lines 27-43) using plasma arc 18 to destroy carbon blank/soot and fugitive toxic materials, it does not have a fire eductor. Nolting discloses an eductor 16 with a plasma torch 18 inside for an efficient thermal gasification of the waster per figs 1-2. It would be obvious for person of ordinary skill in the art to provide such eductor with plasma electrode to Chan in view of Nolting so as to do additional thermal gasification of the waste with better exposer.

For claim 14, Chan discloses a minimum temperature of 1350 deg C for second gasifier and it would merely choice in design per ordinary skill in the art to have temperature of about 900-1300 deg C for the furnace to get gasification while primary gas enters the second stage.

For claims 16-17, the heat exchanger 7 of Chan would be considered to lower the out going gas temperature from the second stage 3 to be below 100 deg C so as to freeze the thermodynamic equilibrium of the fuel has and avoid production of secondary pollutants. The air pollution control system 8 of Chan discloses final cleaning of the gas.

For claims 20-22 and 24-25, the claimed combination of Chan and Nolting discloses most limitations (disclosed in claims 1-19) above except the second plasma torch gasifier 3 has a refractory lining 32 per fig 3 for insulation against high temperature and primary gasifier 4 uses two graphite electrodes 15 so as to create two arcs.

8. Claims 2 and 11-12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chang in view of US patent 5,451,738 of Alvi et al. Chan does not disclose a dust

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separator for cleaning the gas from particulate. Alvi discloses a cyclonic gas scrubber 24 for cleaning the processed gas and the cleaned dust particles (would be considered as predetermined larger particles per choice in design of the dust scrubber) than are recycled per dotted line in diagram 1 from scrubber 26 to the primary reactor 14. It would be obvious for a person of ordinary skill in the art to provide such cyclonic scrubber to Chan in view of Alvi so as to separate the particles like carbon black from the processed gas produced from first stage.

9. Claim 23 is rejected under 35 U.S.C. 103(a) as being unpatentable over Chan and Nolting as applied to claim 20 above, and further in view of Alvi. Neither Chan nor Nolting disclose a dust separator for cleaning the gas from particulate. Alvi discloses a cyclonic gas scrubber 24 for cleaning the processed gas table over Chan

Conclusion

10. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. The prior art of Chan, Nolting and Alvi disclose the current state of the art in a two stage plasma process for converting waste into fuel gas and apparatus therefor.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to NIKHIL MASHRUWALA whose telephone number is (571)270-3519. The examiner can normally be reached on Monday thru Friday- 7:30am-5:00pm.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Steven McAllister can be reached on 571-272-6785. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Nikhil Mashruwala/
Examiner, Art Unit 3749

/Steven B. McAllister/
Supervisory Patent Examiner, Art Unit 3749